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ABSTRACT

This report describes the procedures and results of a field test of an instructional unit intended for upper elementary and secondary teachers who have some access to computers. The unit consists of five booklets covering the rudiments of computer hardware, computer programing languages, the different roles the computer may play in instruction, how the computer is used in different curriculum areas, and how to select an instructional computer application that is appropriate to one's needs. The field test population consisted of teachers both inexperienced and experienced in computer use. Evaluation focused upon the attainment of educational objectives, the potential of competitive educational methods, and on important side effects from the use of the materials. The data indicated that the objectives were obtained and, unexpectedly, even the experienced group benefited. Competitive instruction through a seminar was judged not significantly different from booklet use, though booklets are thought to be independently usable. Side effects (unexpected outcomes) were numerous: notably, increased interest in computer use, in the demand for computer access, in the need to develop a communication network about computers and in an awareness of computer information resources. The objectives of each booklet and the questionnaires used are presented in appendices. (DAG)

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TECHNICAL REPORT

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SELECTING AND SPECIFYING COMPUTER ENHANCED UNITS

COMPUTER TECHNOLOGY PROGRAM

IR004494

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INTRODUCTION

The purpose of this technical report to the National Institute of Education is to describe the interim version of the instructional unit "Selecting and Specifying Computer Enhanced Units," and to describe the procedures and results of the field test of that unit. "Selecting and Specifying" is one of a series of instructional units being developed by the Computer Technology Program at the Northwest Regional Educational Laboratory, under contract with the National Institute of Education. It is hoped that the information furnished herein will be valuable to NIE in its task of monitoring the development and evaluation of this project.

MATERIALS

Intended Use

These materials are intended primarily for the instruction of upper elementary and secondary school teachers who have some access to computers. Since Computer Enhanced Instruction (CEI) materials are highly subject oriented, this instruction is primarily for those teachers who are deeply involved in one or two subject areas. However, secondary audiences for these materials may be experts in CEI applications and college or in-service instructors interested in teaching about CEI.

The booklets developed in this project may be used in several different ways. The original intent of the developers was that all five booklets were to form the basis for a four-day workshop on selecting computer-enhanced units, with How to Select Units to serve as the primary text, and the Background Booklets to serve as a supplement for those participants who might lack some necessary knowledge of computers in instruction. Since it was expected that these workshops would contain participants with varying experience in computers, the Background Booklets were designed to bring all participants to a common level of knowledge. However, alternate formats have been proposed and employed. In one case, the Background Booklets only were used as the basis of a four-day workshop for teachers naive about computers, and in another case, How to Select Units was used as the basis for a four-day workshop for teachers experienced in computers. Thus, developers believe that these materials can be used flexibly in a number of settings where the concern is instructional applications of the computer.

Description of Materials

"Selecting and Specifying Computer Enhanced Units" is an instructional system consisting of five booklets. Four of the booklets are called "Background Booklets," and they are intended to acquaint the user with the rudiments of computer hardware, computer programming languages, the different roles the computer may play in instruction, and how the computer is used in several different curriculum areas. The fifth booklet, titled How to Select Units. is intended to teach the user how to select an instructional computer application that is appropriate to his needs. A description of each booklet, including objectives as stated in the booklet, appears below.[1]

Hardware at a Glance

This is a 22-page booklet in five sections designed to introduce the user to the fundamental aspects of computer hardware. The booklet first describes the three basic types of hardware--input/output units, the central processing unit, and storage devices--and then very briefly introduces software and its uses. Next, it describes the interactive and batch modes of communicating with the computer and discusses their advantages and disadvantages. In the third section, the different types of input/output units are described with particular emphasis on interactive terminals. The fourth section explains briefly how and where a computer program is stored and the last section deals with size of computer systems. At the end of the unit, a Comprehension Check allows a check of the student's understanding of the key concepts in the unit.

[1]For ease of future reference, objectives of all five booklets are collected in Appendix A.

Listed below are the instructional objectives for this unit which identify what a person who completes the booklet should be able to do:

1. List the three essential pieces of hardware for a computer system.
2. Distinguish between interactive and batch modes of processing.
3. State the advantages and disadvantages of interactive processing.
4. Recognize some commonly used input/output devices.
5. Define what is meant by "time-sharing."
6. Describe how a program is activated for use in terms of the computer's working memory and computer storage.
7. Explain what happens to a program when the user signs off the terminal.
8. Know where to obtain advice as to whether or not your computer is large enough to run a given program.

Software at a Glance

This unit is a 47-page booklet in four sections designed to introduce the user to important topics in computer software. The first section deals with the mechanics of selecting and running a computer program on a teletype. The second section explains the purpose of a programming language and introduces five such languages. The third section describes the components of a computer program, including input instructions, processing instructions, output instructions, END, and remarks. A simple program is used as an example to show how a computer would execute each program component. The fourth section lists and describes the keys to

recognizing four languages--FORTRAN, BASIC, ALGOL, and PL/1. At the end of this unit, there is also a Comprehension Check.

Listed below are the instructional objectives for this unit which identify what a person who completes the booklet should be able to do:

1. List at least three available sources of user's programs
2. Identify three common ways of loading a program for use
3. Describe two common ways a program can be "stored" for use in the classroom
4. Identify the differences between machine language and programming languages
5. Describe the function of translators in the computer's software system
6. Explain the main reason why there are many different programming languages
7. State the three fundamental elements involved in any computer program
8. Given a simple program in any of the languages commonly used in instructional programs
    - o Identify the input instructions
    - o Identify the processing instructions
    - o Identify the output instructions
    - o Identify the control instructions
    - o Identify the programmer's remarks
    - o Determine the general purpose of the program
9. Follow a simple BASIC program dealing with a subject in one's discipline and understand the main steps the computer goes through in processing input and producing output.

The Roles of the Computer in Instruction

This is a 50-page booklet designed to acquaint the user with several of the roles that the computer can play in instruction. The first section

describes how the role of the computer can vary and introduces the five most important roles of the computer in instruction. The second section discusses the use of the computer as a drill and practice device. The third section explains using the computer as a tutor. The fourth section explains the role of the computer in problem-solving in the classroom. The sixth section details the role of the computer in simulations and games. This unit concludes with a cautionary note about the overlap of the various roles and briefly describes some additional roles of the computer in instruction. As before, a Comprehension Check is included at the end to assist the user in verifying his understanding of the key concepts.

The following instructional objectives for this unit describe what a person who completes the booklet should be able to do:

1. Name the five major roles of the computer in instruction.
2. State the distinguishing characteristics of programs which use the computer in each of the five major roles.
3. Given a sample interaction with a program, determine which computer role is used.
4. Explain how computer roles may overlap in a single instructional program.
5. Determine which computer roles would be appropriate for specific instructional situations.
6. Identify the functions of computer-managed instruction (CMI).
7. Identify the main characteristics of the inquiry mode of computer use.

Computers in the Curriculum: A Book of Readings

This is a 149-page booklet designed to acquaint the user with actual and potential applications of the computer in a variety of curricula. Consisting of a series of readings written by experts in computer applications, the booklet describes ways the computer might be used in courses of art education, business education, education of the handicapped, elementary education, language arts, mathematics, music, physical education, secondary science, natural science, the social sciences, social studies, and vocational agriculture. No instructional objectives have been specified for this unit because the book was intended only to convey general information.

How to Select Units

This unit is a 60-page booklet designed to teach the user how to select instructional computer applications which are appropriate to his or her needs. The unit has been organized into three major parts. The first part of the unit describes the five roles of the computer in instruction and explains the two main components of a computer-enhanced instructional experience: the computer system and instructional unit. This part of the unit concludes by introducing a two stage process for evaluation of computer-enhanced instruction units. The second part details the first stage of the evaluation process, which focused on whether the unit one is interested in is usable on an available computer. Five critical questions to ask about characteristics of the computer system and the instructional units are listed. The process of making an initial decision based on the answers to these questions, is also discussed. The third part details the final stage of the

decision process, which is concerned with final decisions. It lists and explains such considerations as enhancement of instruction, "student-proofness," user-orientation, controllable variables, options for use, and time and cost factors. This section concludes with a discussion of the final decision, and the specification of a procedure for assigning weights to the various factors for purposes of decision-making. The unit also includes an appendix which lists a number of sources of computer-enhanced instruction units. Sample printouts are used liberally, in order to acquaint the user with available programs. Exercises are also included at various points in order to give the user practice in the key concepts.

The following instructional objectives describe what a person who completes the unit should be able to do, given a computer-based instructional package:

1. List five critical aspects of a computer-enhanced unit which should be examined at the initial stage in selecting units for classroom use.

2. For each of the initial critical aspects of a unit, explain why it is critical in the selection process.

3. List at least five final aspects of a unit which should be considered in making final decisions on units.

4. Describe or explain what the terms "student-proof" and "user-oriented" mean, in terms of computer programs.

5. Discuss how the number of variables and the number of options in a computer program relate to the program's utility in the classroom.

6. Identify three time/cost factors involved in using computer-enhanced units in classroom instruction.

7. Given computer-enhanced curriculum units in their field of teaching--

   - o Determine if the hardware and software requirements make the units feasible for use.
   - o Determine if the objectives, materials, and models are suitable for his/her use.
   - o Rate the units on at least five final variables.
   - o Select the unit(s) which will best suit their needs.

DEVELOPMENTAL HISTORY

Developmental Plan

The plan for development of the "Selecting and Specifying Computer Enhanced Units" was guided by the Northwest Regional Educational Laboratory's model for product development. This model, broadly conceived, calls for initial conceptual work, followed by the development of an exploratory version of the product. The exploratory version is tested, and formative evaluation data are gathered that are utilized in building the next developmental version, called the prototype version. A pilot test of the prototype yields further formative data which guide the development of an interim version of the product. Finally, summative data about the product are gathered in a field test.

Initial Development

The initial development of the materials in the "Selecting and Specifying Computer Enhanced Units" course was guided by a preliminary assessment of contents and selection criteria made in January and February 1973, by several experts in the use and development of computer-oriented instructional materials: Don Holznagel of Southern Minnesota School Computer Project; Glenn Ingram, then Director of the Washington State University Computer Center; Elizabeth Williamson of the Huntington Two Project, SUNY and Judith B. Edwards, principal developer for the materials. These assessments were reviewed by Glenn Ingram and some final suggestions were made.

Based on this initial content determination, the principal developer began in April 1973, to draw up the outline of products and processes for this course. At the same time, a complete set of goals for each component was developed. The initial list of components included:

Computer Hardware for Instruction

Computer Software for Instruction

Instructional Modes

The Computer in Instruction

Writing Behavioral Objectives

What is a Model?

Filmstrips illustrating instructional uses of computers; How to Select Computer Instruction Materials
How to Write Specifications for Computer Instruction Materials.

A two-day consultation session was held in May 1973 involving Don Holznagel, Judith Edwards and Dan Klassen to define specific contents and criteria for each component in the materials. Choosing from a vast number of available programs and units, consultants also created a resource pool of samples illustrating key concepts, program features, and types of materials to be treated in the course.

Following the guidelines established in consultation sessions, development of the materials began in June 1973. Through the initial development phase, editorial and developer decisions introduced the following changes in the course components:

1. Writing Behavioral Objectives was to be excluded, as several excellent tests on the skill were currently available

2. What is a Model? was to be excluded from the Background Booklets and the topic treated briefly in the "Selecting" text

3. The filmstrip would be unnecessary, since ample illustration of computer uses would be given by the "Computers in the Curriculum" booklet, together with user participation in sample unit experiences during the course

4. Two sets of sample units should be provided (a set of 15 to 20 exemplary units for use with the course and a starter set of 40 units) along with a diagnostic test which could tell course participants which Background Booklets they needed to study at the outset.

Exploratory Test

In September 1973, exploratory versions of all components, except the Leader's Guide and the specially designed introductory sample unit were ready for testing. Blue Mountain Community College in Pendleton, Oregon, was selected as the test site, with 20 teachers testing the course materials in a workshop setting.

Biographical data on the teachers indicated that the group was comparable to the general target population. Specifically, they represented a wide range of educational backgrounds and teaching experience, as well as generally having had little or no previous experience with computers in instruction. The available exploratory versions of materials were used with this initial test group, beginning in early October 1973 with an introductory sample unit called BALPAY (a previously developed unit) being substituted for the introductory sample unit that was not yet available.

Test data were collected in three ways:

1. An eight item questionnaire about contents and readability was completed by each participant after reading each component in the course.

2. Participants were asked to make notes about problems and suggestions in their copies of each book and to hand in these annotated books at the end of the workshop.

3. Verbal data were obtained by taping two round-table discussions about the components and the course as a whole.

On the basis of this initial testing, considerable data were collected which were used in planning revisions of the components. Since not all of the course materials were available for this test, however, it was decided that another test should be made before revising the components, with the exception of the How to Select Units test. In consultation with Judith Edwards, Dan Klassen, the new developer, made complete revisions of the text in January 1974 and a revised exploratory version was available in February 1974. In addition, the special introductory sample unit, Urban Crime Unit, and the Leader's Guide were available in exploratory versions at this time.

A second test was conducted in February 1974 at Sunset High School in Beaverton, Oregon, with a group of teachers comparable to the group at Blue Mountain Community College. The data collected from this test were largely anecdotal, with the developer, Dan Klassen, on site to observe. Additional data were collected on the text How to Select Units. Further, data substantiated the advisability of excluding the diagnostic test and the two sets of sample units as unsuitable. In addition, it was suggested that

the text, How to Write Specifications for New Units, be excluded until a later time, when guides for "Developing Units" would be written and could serve as a focus for the writing of specifications.

Prototype versions of the course components were available in June 1974 for pilot testing, including:

Leader's Guide
Urban Crime Unit
How to Select Units
Hardware at a Glance
Software at a Glance
The Roles of the Computer in Instruction
Computers in the Curriculum: A Book of Readings

The Leader's Guide and the Urban Crime Unit were designed to assist instructors in using the Background Booklets and How to Select Units at test sites. There was no plan to evaluate the effectiveness of the Guide and the Urban Crime Unit.

Pilot Test

In the pilot test,[2] the materials were tested in two sections. The four Background Booklets were tested in one set of workshop sessions, and How to Select Units was evaluated in another set.

Pilot testing on the Background Booklets was carried out in five summer workshops, sponsored by the Minnesota Educational Computing Consortium (MECC), involving five groups of elementary and secondary teachers in a variety of subject areas.

[2]The pilot test report dated July 1974, fully discusses the plan, procedures and results of pilot testing efforts.

Each of the five groups was given a pre-test covering attitudinal and cognitive objectives related to the Background Booklets. Two of the groups then spent four days reading and discussing the Background Booklets, learning how to use the computer and using Computer-Enhanced Instruction (CEI) programs. One of these two groups was led by a developer of the materials, while the other was led by a MECC group leader. The remaining three groups underwent a regular MECC workshop.

All groups then were given post-tests of attitude and knowledge. Results of the testing showed that the developer-led group scored highest in the area of knowledge. This may reflect the developer's greater acquaintance with the materials. Further, results indicated that under some conditions, the Background Booklets can be more effective than a competitor.

Testing of the How to Select Units booklet involved members of two other MECC sponsored workshops, and involved a sample of teachers experienced in the use of computers. Each of the two groups filled out a biographic questionnaire and took pre-tests of attitude and knowledge covering objectives of the How to Select Units booklet. Following instruction in the contents of the How to Select Units booklet, both groups took post-tests of knowledge and attitude.

Results of testing showed that both groups made significant gains from pre-test to post-test, but that there was no significant difference between the gains of the two groups.

Data collected about the materials during the pilot test were also useful to developers in revising the product for the final stage of development. The following decisions regarding revision were made:

1. The Background Booklets on computer hardware and The Roles of the Computer in the Curriculum were judged satisfactory.

2. Stated objectives in the Background Booklet, Software at a Glance were changed. Also, the section on discrimination of languages was made optional.

3. For the Background Booklet, The Role of the Computer in Instruction, definitions of drill and practice and tutor as they apply to computer functions were changed. The comprehension check was also revised to accommodate these changes.

4. How to Select Units was judged satisfactory.

SUMMATIVE EVALUATION

Purpose of Summative Evaluation

The purpose of the summative evaluation is to provide data about the performance of the product.

The summative evaluation of "Selecting and Specifying Computer Enhanced Units" had three foci. First, the evaluation focused upon the attainment of instructional objectives. Here, the evaluation was concerned with whether or not the use of the materials led to achievement of instructional goals.

The second focus was on "critical competitors." The Evaluation sought to determine whether the materials perform better than their potential competitors in the educational market.

Finally, the third focus of the summative evaluation was upon the identification of any important side effects, either positive or negative, of use of the materials.

The field test was undertaken during the month of October 1974 in Minnesota.

Background of Populations Tested

The population tested consisted of a treatment group of teachers inexperienced in the use of computers and a comparison group of teachers who had had experience with computers.[3]

Group 1 (experienced) consisted of 11 teachers enrolled in a workshop of the MECC who were receiving training in the "Selecting and Specifying Computer Enhanced Units" system as part of their workshop training.

[3]Appendix D contains background data on the workshop participants.

Enhanced Units" system as part of their workshop training.

Group 2 (inexperienced) consisted of 12 students enrolled in a computer course entitled "Computers in the Classroom" at Mankato State University in Mankato, Minnesota. This class consisted of current and prospective teachers, and they received the workshop covering the How to Select Units booklet as a part of the coursework for the class.

Both groups contained teachers of grades 7 through 12. The average teaching experience in Group 1 was 15.5 years (range 7 through 14), while for Group 2, average teaching experience was 5 years (range 4 through 7). Eight of the participants in Group 2 reported no teaching experience. Group 1 participants had substantially more experience as teachers than did participants in Group 2.

Nine of the participants in Group 1 had at least some experience with computers; however, only five (out of eleven) reported themselves as being "experienced" (that is, knowing a programming language and being capable of writing classroom applications) with computers. All 12 of the participants in Group 2 classified themselves either as having "moderate experience" or as being "experienced." Nine of the twelve participants in Group 2 classified themselves in the latter category, so that it can be said that participants in Group 2 were substantially more experienced in the use of the computer than participants in Group 1.

The treatment group (Group 1), received both the Background Booklets and the How to Select Units. The control group (Group 2), received the How to Select Units only, along with materials and a teacher's guide for a workshop, designed to help participants master the materials in the booklet.

Cognitive Assessment

Major revisions in the instrumentation for this field test were undertaken since instructional objectives of the materials had been substantially revised during exploratory testing. However, items found to be acceptable during pilot testing were retained if they were consistent with the new objectives.

A set of 53 items was constructed and assembled to measure achievement of the instructional objectives for the Background Booklets.[4] These 53 items were randomly divided into four subtests of varying lengths for purposes of multiple matrix sampling:[5]

Subtests	No of Items
Form B-1	13
Form B-2	13
Form B-3	14
Form B-4	13

To measure achievement on the How to Select Units objectives, a set of 18 items was constructed and assembled. These items were randomly subdivided into three tests of six items each, and designated Forms S-1, S-2 and S-3.

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[4]Objectives are listed in Appendix A. Additionally, a complete set of instruments used in the field test is collected in Appendix B.

[5]Sirotnik, Kenneth A., "Introduction to Matrix Sampling for the Practitioner," in Evaluation in Education, W. James Popham, ed., McCutchan Publishing Company, 1974, pp. 451-530.

Attitudinal Assessment

An instrument measuring participants' attitude toward computers in the classroom was also devised. This instrument was administered before and after the workshop to both groups. On the post version, an additional set of questions was supplied which attempted to elicit how participants felt about the workshop. The post version also asked participants for certain background data, as previously described. (See Appendix B for these questionnaires).

Selection of Critical Competitor

For the Background Booklets, a literature search revealed no single published competitors which shared a significant number of instructional goals with the background materials. The main shortcomings of the materials identified involved:

a. Lack of classroom applications, other than CAI or CMI

b. Lack of specific subject area applications for use by the classroom teacher

The second most likely source of competition was deemed to be college courses in educational applications of computers. A course, Computers in the Classroom, taught at Mankato State University which contained goals similar to those of the How to Select Units booklet, was selected.

Another literature search revealed no published competitors that covered the same content as How to Select Units. However, three organizations were identified that conduct workshops for teachers using

computers in the classroom. The workshops are generally intended for naive teachers, and one of these--the workshop conducted by MECC--was selected as the most serious competitor. This workshop consisted of an introduction to the use of the computer as a classroom tool, and the instructional goals were deemed highly similar to the goals of both the Background Booklets and the How to Select Units booklet.

Side Effects

The following procedure was used to determine if the possible "immediate" side effects (8a, b and c) could be detected. Workshop leaders and randomly selected teachers were asked if they observed any of the possible immediate side-effects identified above, or any other side effects. They were also asked about their general impression of the workshop. Responses were tape recorded.

Test Procedures

The treatment group received in the mail, (one week prior to the workshop) a packet containing:

An introduction letter

An attitude pre-questionnaire

A pre-test of background materials (Form B-1, B-2, B-3 or B-4) and the four background booklets

Students were directed to study the four Background Booklets in the week before the Workshop began.

At the beginning of the first Workshop session, participants were asked to record which form of the background pre-test they received (so that they would receive a different form for the background post-test) and the attitude and background pre-tests were both collected. Participants were then given a background post-test.

When it was completed, participants received and completed the How to Select Units pre-test, again recording the form of it they took, so as to insure they would have a different form on the post-test.

At the conclusion of the second workshop session, the "Selecting" post-test and the attitude post-questionnaire were administered and collected.

The comparison group followed essentially the same schedule, except that it received no background pre-test.

The two schedules compared appear schematically as follows:

	Attitude Pre-test	Background Pre-test	Background Post-test	Selecting Pre-test	Selecting Post-test	Attitude Post-test
Treatment (Group 1)	X	X	X	X	X	X
Comparison (Group 2)	X		X	X	X	X
	One week before the workshop		Beginning of the the workshop		End of the workshop	

RESULTS

As described in the previous section, a pre-test and post-test measurement of prevalent attitudes about the use of computers was administered to both groups. The instrument consisted of eight items. A summary of the pre- and post-test mean scores for each item along with t-tests of significance for pre- to post-test gains are presented in Table 1.

TABLE 1

Summary of Pre- to Post-test Attitude Gains
(Score Range 1-7: Low scores denote positive attitudes)

	Group 1 (Treatment) N = 11			Group 2 (Comparison) N = 12		
Question	Pre-test Mean*	Post-test Mean	t-Value	Pre-test Mean	Post-test Mean	t-Value
1. Computer Usefulness	2.6**	2.2	3.67***	1.8	1.3	2.18
2. Knowledge of classroom computer use	4.1	2.5	4.40***	2.8	2.0	2.49***
3. Confidence about computer use	4.8	2.8	6.06***	2.6	2.3	1.08
4. Willingness to use computer	1.5	1,5	.00	1.4	1.7	1.67
5. Competence in use of computer	4.1	2.5	6.75***	2.8	2.4	1.56
6. Number of computer uses known	4.5	2.7	4.92***	2.9	2.1	2.11
7. Frequency of planned computer use	3.0	2.5	.98	1.4	1.8	1.09
8. Ability to choose appropriate computer applications	3.9	2.6	3.04***	2.9	2.5	1.00

* Pre-test means adjusted for loss of respondents from pre-test to post-test

** Range 1-7 with low scores indicating positive attitudes

*** Significant at the .05 level or better

In the pre-test, the comparison group tended to express a more confident attitude toward computers than did the treatment group. This was expected since the comparison group was composed of persons experienced in the use of computers. This confidence is reflected by the responses to all eight items. The means for each of the items for the comparison group are consistently lower than for the treatment group, indicating a more confident attitude.

From pre-test to post-test substantial gains were made by the treatment group, Group 1, on all items except numbers 4 and 7. The lack of gains on these two items is most likely due to the fact that they tap the respondents' basic attitudes toward the use of computers in instruction which is unlikely to be changed during a brief workshop. The other items are oriented more toward knowledge and applications of computer use. The comparison group, Group 2, does not show a gain from pre-test to post-test, but it still has somewhat more positive ratings than Group 1. The only significant pre/post gain for Group 2 is on Item 2 which has to do with knowledge of classroom computer use. This result is not surprising since the workshop was intended to increase knowledge of classroom computer use.

In order to test the difference between the two groups on the attitude post-test, an analysis of covariance was carried out, using the attitude pre-test as the covariate. The results of this analysis appear in Table 2. As these data show, there are no significant differences for seven of the eight items on the test. Hence, it can be concluded that the two groups tested do not differ in attitude toward computers in the classroom. Furthermore, it is notable that all attitudes expressed are positive. 24

TABLE 2

Analysis of Covariance for Attitude Tests (Groups 1 and 2)

Item		SS	df	MS	F
1. Computer Usefulness	Total	8.75	20		
	Error	8.81	19	.46	.07
	Treatment	.06	1	.03	
2. Knowledge of class-room computer use	Total	12.83	21		
	Error	12.83	20	.56	.02
	Treatment	0	1	.01	
3. Confidence about computer use	Total	10.86	21		
	Error	7.45	20	.37	9.21*
	Treatment	3.41	1	3.41	
4. Willingness to use computer	Total	4.47	21		
	Error	4.23	20	.21	1.04
	Treatment	.24	1	.24	
5. Competence in use of computer	Total	12.05	21		
	Error	11.40	20	.57	1.14
	Treatment	.65	1	.65	
6. Number of computer uses known	Total	19.71	21		
	Error	19.61	20	.98	.10
	Treatment	.10	1	.10	
7. Frequency of planned computer use	Total	35.55	21		
	Error	35.04	20	1.75	.29
	Treatment	.51	1	.51	
8. Ability to choose appropriate computer applications	Total	11.28	21		
	Error	11.27	20	.56	.02
	Treatment	.01	1	.01	

* Significant at the .01 level

As the table shows, Group 1 had a significant positive gain for six of the eight items, while Group 2 had only one significant positive gain. However, since Group 2 had high pre-test scores, it is likely that a ceiling effect occurred, diminishing the possibility of significant positive gain.

On the attitude post-test there were 11 additional items which were intended to assess the participants reaction to the workshop and materials. Means and standard deviations on each of these items for each group are displayed in Table 3. As can be seen from the data, the participants had a generally positive attitude toward the workshop and materials. In order to determine whether or not there might be a difference between the ratings of Groups 1 and 2 a t-test was run on all items. The result showed no significant difference in attitude toward the workshop between the two groups.

TABLE 3

Means and Standard Deviations for Items Related to Satisfaction with the Workshop and Materials

Questions	Group 1 (N = 11)		Group 2 (N = 12)	
	Mean	S.D.	Mean	S.D.
* 9. Relevance of materials	1.9	.70	2.2	1.03
10. Usefulness of materials	1.9	.83	2.2	1.53
11. Amount learned	1.5	.69	2.1	1.08
** 12. Adequacy of time allowed for workshop	4.4	.67	4.7	1.15
13. Quality of materials	2.0	.45	2.5	1.00
14. Value of skills learned	1.9	.70	2.0	1.21
15. Usefulness of workshop	2.0	1.48	2.5	1.51
16. Value of materials for future reference	1.5	.69	1.8	1.34
17. Eagerness to recommend workshop to others	1.6	.67	2.3	1.50
** 18. Appropriateness of difficulty level	4.4	1.21	4.7	1.30
19. Overall satisfaction with workshop and materials	1.9	.54	2.3	1.06

* All items are 7 point rating scales with the positively weighted end at 1, except as indicated below.

** These two items are written so that the most favorable response would be the mid-point of the scale, 4.

The treatment group received both a pre- and a post-test on the Background Booklet information, while the comparison group received only a post-test over this material. The results of this testing are presented in Table 4. Since the tests were conducted using a matrix sampling technique to allow more thorough coverage of the content, the results are reported in terms of weighted averages of the scores on the various forms of the test.

The standard error of the mean and the 95% confidence interval for each sample mean are presented to allow the reader to get an idea of the range in which the true population mean would fall. In addition coefficient alpha for each test is presented to provide the reader with an assessment of the internal reliability of the tests. As can be seen the reliabilities reported are quite respectable for a test that has been developed for a specific evaluation study.

The table also reveals that the pre/post gain for Group 1 was significant at the .05 level demonstrating that the Background Booklets improved the participants knowledge of computers. However, none of the mean test scores are very high, indicating that the workshop participants still were not well acquainted with the information about computers.

TABLE 4

Results of Background Booklet Testing Based on Weighted Average of the Matrix Sample Taken: Group 1 and Group 2

Test	Weighted Average Mean	Standard Error of Mean	95% Confidence Interval	Coefficient Alpha	Gain Score	t
Group 1 (Treatment) Pre-test	28.7*	1.25	26.24-31.15	.93		
Group 1 (Treatment) Post-test	34.02	1.37	31.33-36.70	.75	5.32	2.91**
Group 2 (Comparison) Test	26.50	1.30	23.95-29.05	.72		

* Scores represent averages for the entire test--53 points possible.

** Significant at the .05 level.

A comparison of the mean score of Group 1 on the background post-tests and Group 2 background test (see Table 5), reveals that Group 1's reading of the Background Booklets prepared them significantly better for the workshop than had previous experience with computers prepared Group 2. To determine whether this observed difference might be due to Group 1 being better prepared for the workshop, a comparison of the pre-test of Group 1 with the Group 2 test was done (see Table 5). This revealed no significant difference between the two groups prior to receiving the Background Booklets.

TABLE 5

Comparison of Group 1 and Group 2 Tests on Background Booklet Information

Group	Mean	t-Value
Group 1 Pre-test	28.70	1.167
Group 2 Test	26.50	
Group 1 Post-test	34.02	5.110*
Group 2 Test	26.50	

* Significant at the .05 level

The How to Select Units booklet was tested using pre- and post-tests for both treatment and comparison groups. The results of this testing are presented in Table 6. These results are presented in terms of a weighted average of the three subtests which composed the matrix sample taken. Again the coefficient alpha's indicate that the tests are fairly reliable. Both groups achieved significant gains from pre- to post-test. However, Group 1 was lower on both pre- and post-test than Group 2. These differences between the two groups were tested and found to be significant. (See Table 7.) The question of whether the gains made by the two groups were different was also tested. In this case it was determined that the groups were not significantly different in the gains they made over the course of the workshop. (See Table 8.) Thus, Group 2 was superior to Group 1 on pre- and post-tests, but Group 1 achieved as great a gain from pre- to post-test as did Group 2. However, it is of some concern that neither group achieved a very high level of competence on the material covered by the How to Select Units booklet, as indicated by the low mean in both cases.

TABLE 6

Results of the "How to Select Units" booklet Testing Based on the Weighted Average of the Matrix Sample Taken

Test	Weighted Average Mean	Standard Error of Mean	95% Confidence Interval	Coefficient Alpha	Gain Score	t
Group 1 Pre-test	3.414*	.408	.614-4.214	.69	6.286	9.589**
Group Post-test	9.7	.661	8.404-10.996	.65		
Group 2 Pre-test	7.17	.684	5.829-8.511	.80	4.68	5.013**
Group 2 Post-test	11.85	.642	10.592-13.108	.75		

* Scores represent the average for the entire test--18 points possible.

** Significant at the .05 level.

TABLE 7

Results of a Comparison of Group 1 and 2
Pre- and Post-test Means for "How to Select Units" Tests.

Group	Pre-test	t-Value	Post-test	t-Value
Group 1 (Treatment)	3.414	4.91*	9.7	2.47*
Group 2 (Comparison)	7.17		11.85	

* Significant at the .05 level.

TABLE 8

Results of a Comparison of Group 1 and 2
Gain Scores for the "How to Select Units" Tests

Group	Gain Score	t-Value
Group 1 (Treatment)	6.286	2.02*
Group 2 (Comparison)	4.68	

CONCLUSIONS AND RECOMMENDATIONS

Conclusions

The data and results described above have led to the following conclusions for each focus of the summative evaluation.

Question 1: Are the objectives of the system attained?

Pre/post gains scored by Group 1 on the instrument measuring attainment of objectives for the background materials were significant. (See Table 4 above.) Thus, it may be concluded that Group 1 did indeed attain the objectives of the Background Booklets.

Significant gains on the instrument measuring attainment of objectives of the How to Select Units booklet were achieved for Group 1 and Group 2. Thus, it is reasonable to conclude that both groups achieved the instructional objectives of the booklet. Although Group 2 scored higher than Group 1 on both the pre- and post-tests, the difference in gain between the two groups is not statistically significant. This suggests that persons already familiar with computers, who receive instruction in the How to Select Units booklet without benefit of Background Booklets, may be expected to learn as much as persons who receive the Background Booklets, prior to instruction in the How to Select Units booklet. This implies that the Background Booklets effectively provide the needed information to prepare the participants to use the How to Select Units. Measures of the attitudinal objectives of this system showed that Group 1 showed a significant gain for six of the eight items (see Table 1), yielding the conclusion that 75 percent of the attitudinal objectives were attained. For Group 2, as suggested above,

a "ceiling" effect may have occurred, since the group scored quite high on the pre-test and recorded only one significant gain on the post-test.

Question 2: How do the Background Booklets compare with a critical competitor?

As described above, the Mankato State Seminar was deemed a competitor with the Background Booklets. The testing would determine whether the Background Booklets would prepare a group of teachers for the How to Select Units booklet better than a college course would prepare another group of teachers.

Analysis of gains on the instrument measuring achievement of the How to Select Units objectives showed no significant differences (see Table 7) in gain scores. It may thus be concluded that while both groups appeared to master the objectives, there is no evidence that either mode of preparation (booklets or college course) is superior. Further, these data would support the conclusion that the How to Select Units may be used independently, with a group who is knowledgeable in the area of computers.

Question 3: Are there important side effects?

For purposes of this evaluation, a side effect is defined as an unexpected or unplanned outcome of the product, or as outcomes other than those specified in the products' goal statements.

Developers, evaluators and the instructors at the test sites identified the following possible side effects of the materials:

1. Participants would develop classroom CEI applications
2. Participants would further pursue their education in the area of computers--workshop participation and college courses
3. Participants would agitate for greater computer access
4. Participants would spread enthusiasm for using computers among fellow teachers
5. Participants would learn more about using computers
6. Participants would develop teacher communication networks about computers.
7. Participants would create pro-computer pressure groups within educational structure
8. "Immediate" side effects are:
   a. Increased sociability among teachers in workshops
   b. Idea exchange
   c. Awareness of computer information resources

Side effects 1 through 7 above are long-term in nature and it is not reasonable to expect that they be immediately observable. Since it would require observation over considerable periods of time (one year or more), to determine whether any of these had taken place, and since there is insufficient time within the existing contract for observations of such a length, it is not possible to explore these possible side effects.

Recommendations

On the basis of data gathered during the field test it was recommended that:

1. Certain content changes be made
2. A publisher for the materials be sought.

APPENDIX A: OBJECTIVES OF THE MATERIALS

OBJECTIVES

Hardware at a Glance

1. List the three essential pieces of hardware for a computer system.
2. Distinguish between interactive and batch modes of processing.
3. State the advantages and disadvantages of interactive processing.
4. Recognize some commonly used input/output devices.
5. Define what is meant by "time-sharing."
6. Describe how a program is activated for use in terms of the computer's working memory and computer storage.
7. Explain what happens to a program when the user signs off the terminal.
8. Know where to obtain advice as to whether or not your computer is large enough to run a given program.

Software at a Glance

1. List at least three sources of user's programs available to you.
2. Identify three common ways to loading a program for use.
3. Describe two common ways a program can be "stored" for use in your classes.
4. Identify the differences between machine language and programming languages.
5. Describe the function of translators in the computer's software system.
6. Explain the main reason why there are many different programming languages.
7. State the three fundamental elements involved in computer programs.

8. Given a simple program in any of the languages commonly used in instructional programs--

   - o Identify the input instructions
   - o Identify the processing instructions
   - o Identify the output instructions
   - o Identify the control instructions
   - o Identify the programmer's remarks
   - o Determine the general purpose of the program

9. Follow a simple BASIC program dealing with a subject in your discipline and understand the main steps it goes through in processing input and producing output.

The Roles of the Computer in Instruction

1. Name the five major roles of the computer in instruction.

2. State the distinguishing characteristics of programs which use the computer in each of the five major roles.

3. Given a sample interaction with a program, determine which computer role is used.

4. Explain how computer roles may overlap in a single instructional program.

5. Determine which computer roles would be appropriate for specific instructional situations.

6. Identify the functions of computer-managed instruction (CMI).

7. Identify the main characteristics of the inquiry mode of computer use.

Computers in the Curriculum: A Book of Readings

The objectives are met by and throughout each article.

How to Select Units

1. List five critical aspects of a computer-enhanced unit which should be examined at the initial stage in selecting units for classroom use.

2. For each of the initial critical aspects of a unit, explain why it is critical in the selection process.

3. List at least five final aspects of a unit which should be considered in making final decisions on units.

4. Describe or explain what the terms "student proof" and "user oriented" mean in terms of programs.

5. Discuss how the number of variables and the number of options in a computer program relate to the program's utility in the classroom.

6. Identify three time/cost factors involved in using computer-enhanced units in classroom instruction.

7. Given computer-enhanced curriculum units in your field of teaching:

   - o Determine if the hardware and software requirements make the units feasible for use
   - o Determine if the objectives, materials, and models are suitable for your use
   - o Rate the units on at least five final variables
   - o Select the unit(s) which will best suit your needs

APPENDIX B: QUESTIONNAIRES

ID _____
(Last 4 Digits of Social Security Number)

Date _____

Form S-1

Directions

On the following pages are three types of questions--fill-in-the-blank, short essay and multiple choice. Please respond to each type appropriately and always use the best answer. It is not necessary to guess since performance on this test will only be used to determine the average class performance.

There is no time limit for this test.

1. Suppose that in trying out a computer-enhanced unit that it takes approximately four hours of terminal time to work through the unit, that the program detects typing errors, that there are 10 user-controlled variables and that input and output is fully explained. The acceptability of this unit might be called into question because of:

   a. the degree to which the unit is student proof
   b. an insufficient number of user-controlled variables
   c. the time and cost consideration of using the computer
   d. the number of options available for student use

2. If a computer-enhanced instruction unit does not describe the algorithm or model used in the program most probably it fails to meet the _____criterion.

3. If a CEI program appears to be a rigid, inflexible package which the user can interact with in only one, pre-determined way, it does not have high classroom utility because it does not meet the final decision of criterion of _____.

4. Suppose that you were an eighth grade mathematics teacher and you were looking for computer-enhanced instruction units to use in your class. One that you have found is used to do addition problems. This unit would probably:

   a. Be student proof
   b. Not enhance instruction
   c. Have a number of variables controllable by the student
   d. Enhance instruction

5. If a program will not run on your computer system because FORTRAN is not available, it has not met the _____criterion.

6. If a computer-enhanced instruction unit consists of only a program listing it probably does not meet the _____criterion.

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(Last 4 Digits of Social Security Number)

Date _____

Form S-2

Directions

On the following pages are three types of questions--fill-in-the-blank, short essay and multiple choice. Please respond to each type appropriately and always use the best answer. It is not necessary to guess since performance on this test will only be used to determine the average class performance.

There is no time limit for this test.

1. If a computer-enhanced instruction unit will not run on your computer because the computer does not have enough storage, it has not met the _____ criterion.

2. List five aspects of a CEI unit which should be used in the initial evaluation of a computer-enhanced unit.

a. _____

_____

b. _____

_____

c. _____

_____

d. _____

_____

e. _____

_____

3. If a computer-enhanced instruction unit consists of only a BASIC program which requires an interactive computer with at least 3000 memory locations and you have access to a computer that operates in the interactive mode and has 4000 memory locations, the unit, as it stands probably is:

a. not written in an acceptable language
b. capable of running on your computer
c. acceptable in terms of support materials
d. not capable of running on your computer

4. List three time/cost factors involved in using computer-enhanced units in the classroom

   a. _____

   b. _____

   c. _____

5. If a data analysis program calculates correlations and you want your student to determine averages it most probably fails the _____ criterion.

6. It a computer-enhanced instruction program does not check for an acceptable range of values for the input it most probably does not meet the final decision criterion of _____.

ID _____
(Last 4 Digits of Social Security Number)

Date _____

Form S-3

Directions

On the following pages are three types of questions--fill-in-the-blank, short essay and multiple choice. Please respond to each type appropriately and always use the best answer. It is not necessary to guess since performance on this test will only be used to determine the average class performance.

There is no time limit for this test.

1. If a single unit is useful to the teacher in achieving a number of objectives, it is said to meet the final decision criterion of having several _____.

2. If a computer-enhanced instruction program has a brief but easy to understand output, it probably meets the final decision criterion of _____.

3. List five aspects of a CEI unit which should be considered in making a final decision on a computer-enhanced unit.

   a. _____

   _____

   b. _____

   _____

   c. _____

   _____

   d. _____

   _____

   e. _____

   _____

4. Assume that you are a seventh grade social studies teacher. You are searching for a computer-enhanced unit to help teach your class map concepts. In the course of your searching you find a unit called GEOGRF. In the teacher's manual for GEOGRF you find that the program which requires 4000 storage locations and is designed to teach students the capitals of each of the states in the U.S. by drill and practice. In this case the computer-enhanced unit would probably:

   a. be able to run on your computer
   b. have objectives compatible with yours
   c. not be student-proof
   d. not have objectives consistent with yours

5. If a computer-enhanced instruction unit gives practice in translating French to English and you want to teach translation from English to French, this unit has not met the _____ criterion.

6. Suppose that you are a 10th grade general science teacher. You are looking for a computer-based instruction unit to teach about the causes of air pollution. You have just found a unit called AIRPOL. The model used in AIRPOL yields an air pollution index based on the level of industrial production but does not include automobiles. This would not be acceptable because the model is:

   a. not complete enough
   b. based on reality
   c. too complex
   d. a math model

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(Last 4 Digits of Social Security Number)

Date _____

Form B-1

Directions

On the following pages are three types of questions--fill-in-the-blank, short essay and multiple choice. Please respond to each type appropriately and always use the best answer. It is not necessary to guess since performance on this test will only be used to determine the average class performance.

There is no time limit for this test.

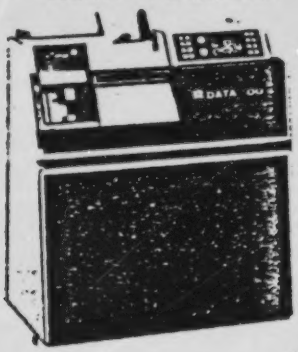
1. After signing off the computer terminal, the program which was used is: _____

   a. Erased from the working area and saved in the storage area
   b. Erased from both the working area and the storage area
   c. Saved in both the working area and the storage area
   d. Erased from the storage area and saved in the working area

2. The _____ mode for the computer is characterized as a learner controlled, responsive learning system.

   a. socratic
   b. problem-solving
   c. discovery
   d. inquiry

3. What kind of input/output device is pictured below?



   a. CRT
   b. Line Printer
   c. Teletype
   d. Card Reader

4. The two most common ways of storing a computer program are:

   a. _____

   b. _____

5. The _____ role of the computer in instruction is most appropriate when students are to collect information, statistically analyze it and evaluate the results.

6. The _____ role of the computer in instruction is most appropriate when students must write a program to find the solutions to a quadratic equation.

7. List three specific curricular topics in your curriculum specialty in which computer-enhanced units would be helpful.

   a. _____

   _____

   b. _____

   _____

   c. _____

   _____

8. The difference between _____ is that one is "understood" by the computer and the other is used by most users.

   a. machine languages and assembly languages
   b. FORmula TRANslation and Beginners All-purpose Symbolic Instruction Code
   c. "English-like" programming languages and machine languages.
   d. the ALGOrithmic Language and COmmon Business Oriented Language

9. The three ways of loading a program for use are _____, _____ and _____.

   a. Loading punched cards, loading a punched paper tape, typing at a computer terminal.
   b. Typing at a computer terminal, loading punch cards, typing at a keypunch.
   c. loading a punched paper tape, typing at a keypunch, loading marked cards.
   d. loading a magnetic tape, loading marked cards, typing at a keypunch.

10. _____ is the instructional role of a computer in which the computer prints out a series of problems such as "5 + 4 = , 9 + 2 = , and 11 + 3 = " and evaluates student's answers.

11. Your local computer expert can provide a number of services. An important one of these services is:

a. advising you whether or not a specific program meets your instructional needs.
b. telling you if a specific program will run on a specific computer.
c. informing you of the instructional objectives of a program.
d. instructing you about the computer's accounting routines.

12. The _____ role of the computer in instruction is most appropriate when attempting to teach about plant growth by means of a mathematical model, which represents a plant growth system.

13. _____ is the instructional role of a computer in which it can be used to find the area of a triangle.

ID _____
(Last 4 Digits of Social Security Number)

Date _____

Form B-2

Directions

On the following pages are three types of questions--fill-in-the-blank, short essay and multiple choice. Please respond to each type appropriately and always use the best answer. It is not necessary to guess since performance on this test will only be used to determine the average class performance.

There is no time limit for this test.

1. State one disadvantage of the interactive mode.

_____

2. The three main functions of Computer-Managed Instruction systems are to:

   a. store student records, tutor the student and analyze student progress
   b. store student records, analyze student progress and direct the learning sequence.
   c. ask the student a question, evaluate his response and record the student's performance.
   d. present information to the student, ask the student questions and record the students responses.

3. Which of the examples given below is the best example of role overlap?

   a. A computer-enhanced instruction unit on cell growth which calculates the average growth rate of 100 different cells and uses this information to provide original instruction about cell growth.

   b. A computer-enhanced instruction unit which calculates the averages and standard deviations of two groups of data and then prints out the average difference, the statistical significance of that average and the correlation between the two groups.

   c. A computer-enhanced instruction unit on the international banking system in which a set of mathematical equations are used to predict what will happen in such cases as when the U.S. sells a billion dollars worth of wheat to the U.S.S.R.

   d. A computer-enhanced instruction unit in which persons interacting with the computer to learn the various roles in modern city government, the functions of those roles and who presently occupies those roles in your city.

4. _____ is the instructional role of a computer in which the student uses the computer to examine the results of a survey which he has conducted.

5. The three sources of computer programs available to you are:

   a. _____

   b. _____

   c. _____

6. The two primary advantages of the batch processing model are that:

   a. it is relatively inexpensive and handles large volumes of data efficiently.
   b. users are actively involved and they get immediate feedback.
   c. it is relatively inexpensive and users get immediate feedback.
   d. users are actively involved and large volumes of data are handled efficiently.

7. When it is desired for the computer to teach a concept as well as provide practice, the _____ role of the computer in instruction is most appropriate.

8. If a computer program is set up so that it requires that a response be given by the user at various times it is most likely to be operating in the _____ mode.

   a. problem solving
   b. interactive
   c. batch
   d. data analysis

9. The computer-based instruction unit from which this output came was most probably a _____unit.

```
>RUN
HELLO, MY NAME IS CHARLIE.
TYPE YOUR NAME
?KELLY
TYPE THE NUMERATOR OF THE FIRST FRACTION
?1
TYPE THE DENOMINATOR OF THE FIRST FRACTION
?2
TYPE THE NUMERATOR OF THE SECOND FRACTION
?3
TYPE THE DENOMINATOR OF THE SECOND FRACTION
?4
TYPE THE DENOMINATOR OF YOUR ANSWER
?6
INCORRECT.  FIRST FIND A COMMON DENOMINATOR BY MULTIPLYING
BOTH THE DENOMINATORS TOGETHER.
TYPE YOUR ANSWER TO THIS MUCH OF THE PROBLEM.
?6
INCORRECT.  FIRST FIND A COMMON DENOMINATOR BY MULTIPLYING
BOTH DENOMINATORS TOGETHER.
TYPE YOUR ANSWER TO THIS MUCH OF THE PROBLEM.
?8

MULTIPLY THE NUMERATOR AND DENOMINATOR OF THE FIRST FRACTION
BY THE DENOMINATOR OF THE SECOND FRACTION
TYPE THE NUMERATOR OF YOUR NEW FRACTION
?2
INCORRECT
```

10. Look over the program listing below and answer the following question.

```
10 REM THIS IS A SAMPLE PROGRAM
20 REM IN ORDER TO RUN THIS PROGRAM
30 REM TYPE GET-SAMPLE AND RUN
35 DIM A(20)
40 INPUT A$,G1,G2,G3
50 B=(G1+G2+G3)/3
60 IF B>3.5 GO TO 90
70 PRINT "STUDENT",A$,"GPA=",B
80 GO TO 40
90 PRINT "STUDENT",A$,"GPA=",B,"HONOR ROLL"
100 GO TO 40
110 END
```

What is the line number for the Control instruction?

_____

11. List three roles the computer can play in your curriculum specialty.

a. _____

_____

b. _____

_____

c. _____

_____

12. The computer-based instruction unit from which this output came was most probably a _____ unit.

```
PLEASE ENTER YOUR STUDENT NO.? 5331
WELL BOBBY     , HOW MANY PROBLEMS DO YOU WANT?5

FOR EACH OF THE FOLLOWING NUMBERS TYPE EACH OF THE
FACTORS SEPARATED BY COMMAS.
51
?51,17,3,1
CORRECT
36
?36,18,12,9,6,3,2,1
CORRECT
29
?29,7,4,1
NO, THE FACTORS OF 29 ARE 29,1
20
?20,10,5,4,1
CORRECT
44
?44,22,11,4,2,1
CORRECT
YOU GOT 4 OUT OF 5 CORRECT
```

13. The function of a BASIC translator is to translate:

a. ALGOL into BASIC
b. Machine language into BASIC
c. BASIC into an "English-like" programming language
d. BASIC into machine language

ID _____
(Last 4 Digits of Social Security Number)

Date _____

Form B-3

Directions

On the following pages are three types of questions--fill-in-the-blank, short essay and multiple choice. Please respond to each type appropriately and always use the best answer. It is not necessary to guess since performance on this test will only be used to determine the average class performance.

There is no time limit for this test.

1. Look over the program listing below and answer the following question.

```
10 REM THIS IS A SAMPLE PROGRAM
20 REM IN ORDER TO RUN THIS PROGRAM
30 REM TYPE GET-SAMPLE AND RUN
35 DIM A(20)
40 INPUT A$,G1,G2,G3
50 B=(G1+G2+G3)/3
60 IF B>3.5 GO TO 90
70 PRINT "STUDENT",A$,"GPA=",B
80 GO TO 40
90 PRINT "STUDENT",A$,"GPA=",B,"HONOR ROLL"
100 GO TO 40
110 END
```

What is the line number for the following instruction?

Programmer's remark_____

2. The computer-based instruction unit from which this output came was most probably a_____unit.

```
>RUN
VOICI UNE PROGRAMME EN FRANCAIS.  MALHEUREUSEMENT, CETTE
MACHINE N'EST PAS EN FRANCAIS.  DONC IL N'Y AURA PAS D'ACCENTS OU
D'AUTRES CHOSES FRANCAIS.
BONNE CHANCE!!
COMMENT VOUS APPELEZ-VOUS?
?MARIE DUPONT

QUELLE PHRASE CELERRE DANS <<LA FARCE DE MAITRE PATHELIN
>>VEUT DIRE<<RENTRONS A NOTRE SUJET>>?
?BE
EXACTEMENT!!
QUEL ROI ETAIT <<SAINT LOUIS>>?
?LUIOUIS IX
EXACTEMENT CORRECTE!!
```

3. _____ is the instructional role of a computer in which a model of reality is operated.

4. Look over the program listing below and answer the following question.

```
10 REM THIS IS A SAMPLE PROGRAM
20 REM IN ORDER TO RUN THIS PROGRAM
30 REM TYPE GET-SAMPLE AND RUN
35 DIM A(20)
40 INPUT A$,G1,G2,G3
50 B=(G1+G2+G3)/3
60 IF B>3.5 GO TO 90
70 PRINT "STUDENT",A$,"GPA=",B
80 GO TO 40
90 PRINT "STUDENT",A$,"GPA=",B,"HONOR ROLL"
100 GO TO 40
110 END
```

What is the line number for the Output Instruction?

_____

5. List the five major roles of the computer in instruction.

1. _____

2. _____

3. _____

4. _____

5. _____

6. In order to obtain information about running a program on a specific computer you probably should:

a. Try running the program
b. Consult your local computer expert
c. Consult the relevant computer manuals
d. Go to the library

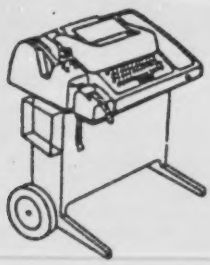
7. Look over the program listing below and answer the following question.

```
10 REM THIS IS A SAMPLE PROGRAM
20 REM IN ORDER TO RUN THIS PROGRAM
30 REM TYPE GET-SAMPLE AND RUN
35 DIM A(20)
40 INPUT A$,G1,G2,G3
50 B=(G1+G2+G3)/3
60 IF B>3.5 GO TO 90
70 PRINT "STUDENT",A$,"GPA=",B
80 GO TO 40
90 PRINT "STUDENT",A$,"GPA=",B,"HONOR ROLL"
100 GO TO 40
110 END
```

What is the line number for the Input Instruction?

_____

8. What kind of input/output device is pictured below?



a. CRT
b. Line Printer
c. Teletype
d. Card Reader

9. The main reason that there are many different programming languages is that:

a. There are many different kinds of computers.
b. Each manufacturer of computers has created programming languages which are unique to his particular machine.
c. Programmers need to accomplish a large number of different tasks.
d. Each of the major fields of computer use has its own particular vocabulary and computational needs.

10. List three specific curricular topics in your curriculum specialty in which computer-enhanced units would be helpful.

a. _____

_____

b. _____

_____

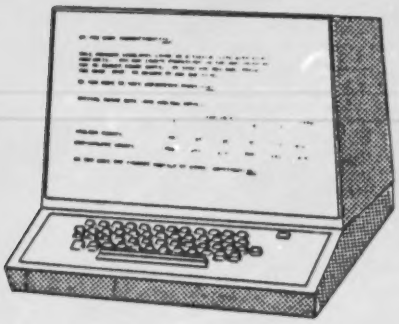
c. _____

_____

11. The computer-based instruction unit from which this output came was most probably a _____ unit.

```
ARE YOU STARTING A NEW GAME(1=YES, 2=NO)?1

YOU ARE A 21 YEAR OLD BLACK MALE.
AT THE PRESENT TIME YOU ARE UNEMPLOYED AND ARE NOT MARRIED.
YOU HAVE A PRIOR POLICE RECORD AND COME FROM A BROKEN HOME.
YOU HAVE NO FATHER AND YOUR MOTHER IS ON WELFARE.
YOU HAVE AN 8TH GRADE EDUCATION AND YOUR TOTAL ASSETS ARE $7

YOU HAVE BEEN ACCUSED OF MANSLAUGHTER.

PLEASE SELECT ONE OF THE FOLLOWING LAWYERS:
1. WHITICAR: HIGH QUALITY AND EXPERIENCED.  COST = $200.
2. SWEENEY: LOW QUALITY AND INEXPERIENCED.  COST = $100.
3. FRANKLIN: PUBLIC DEFENDER.  COST = $0
WHICH LAWYER DO YOU WANT?1
YOU NOW HAVE $500

YOUR BAIL HAS BEEN SET AT $300.  DO YOU WISH TO PAY IT (1=YES,
2=NO)?1
YOU NOW HAVE $200
```

12. What kind of terminal is pictured below?



a. Teletypewriter
b. LTV
c. CRT
d. Line Printer

13. The computer-based instruction unit from which this output came was most probably a _____unit.

ENERGY IS A DEPICTION OF THE ENERGY CRISIS IN THE UNITED STATES. YOU WILL TRY TO SOLVE THE ENERGY PROBLEM BY CHANGING THE BEHAVIOR OF THE AMERICAN PEOPLE, OF BUSINESSES AND INDUSTRIES AND SO FORTH. YOU SHOULD TRY TO BALANCE THE DEMAND FOR ENERGY WITH THE AVAILABLE SUPPLY. FROM TIME TO TIME UNEXPECTED EVENTS WILL OCCUR WHICH WILL REQUIRE YOU TO VARY YOUR STRATEGY.

SINCE THIS IS A VERY SIMPLE MODEL OF A COMPLEX PROBLEM YOU WILL NOT BE ABLE TO CONTROL AS MANY FACTORS AS YOU MIGHT LIKE.

AT THE END OF EACH YEAR YOU WILL BE GIVEN A REPORT. THIS REPORT WILL DESCRIBE THE CONSEQUENCES OF YOUR ACTION.

YOU WILL BE ABLE TO CHANGE 10 FACTORS. TO INCREASE THE FACTOR ENTER A POSITIVE NUMBER. TO DECREASE THE FACTOR ENTER A NEGATIVE (-) NUMBER. IN EITHER CASE, THE HIGHER THE NUMBER THE GREATER THE IMPACT.

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14. The_____role of the computer in instruction is most appropriate when students need to review and apply skills and concepts they have learned elsewhere.

ID _____
(Last 4 Digits of Social Security Number)

Date_____

Form B-4

Directions

On the following pages are three types of questions--fill-in-the-blank, short essay and multiple choice. Please respond to each type appropriately and always use the best answer. It is not necessary to guess since performance on this test will only be used to determine the average class performance.

There is no time limit for this test.

1. _____ is the instructional role of a computer in which original instruction is provided as well as questions and evaluation of responses.

2. List the the three fundamental elements of a computer program:

   a. _____

   b. _____

   c. _____

3. The computer-based instruction unit from which this output came was most probably a _____ unit.

```
DO YOU WANT A DESCRIPTION OF THIS PROGRAM
?YES
THIS PROGRAM COMPUTES SETS OF PAIRS X,Y
THAT SATISFY A QUADRATIC FUNCTION OF THE FORM:
      Y = A*X+2*B*X+C

IT EVALUATES THE FUNCTION FOR EACH VALUE OF
X IN THE INTERVAL WHICH HAS A LOWER LIMIT OF X(1)
AND AN UPPER LIMIT OF X(2), WITH AN INCREMENT(OR
STEP SIZE) OF 1.

ENTER VALUES FOR A,B, AND C ON ONE LINE,
USING COMMAS TO SEPARATE THEM.
?5,7,6

ENTER VALUES FOR X(1), X(2), AND 1
ON ONE LINE, USING COMMAS TO SEPARATE THEM.
?1,10,1

FUNCTION:  Y = 5 * X + 2 * 7 * X + 6

      X       Y

      1       18
      2       40
```

4. List three roles the computer can play in your curriculum specialty.

   a. _____

   _____

   b. _____

   _____

   c. _____

   _____

5. The three essential pieces of hardware for a computer system are:

   a. _____

   b. _____

   c. _____

6. Look over the program and answer the following question.

```
 10 REM THIS IS A SAMPLE PROGRAM
 20 REM IN ORDER TO RUN THIS PROGRAM
 30 REM TYPE GET-SAMPLE AND RUN
 35 DIM A(20)
 40 INPUT A$,G1,G2,G3
 50 B=(G1+G2+G3)/3
 60 IF B>3.5 GO TO 90
 70 PRINT "STUDENT",A$,"GPA=",B
 80 GO TO 40
 90 PRINT "STUDENT",A$,"GPA=",B,"HONOR ROLL"
100 GO TO 40
110 END
```

Give the output of this program as it would appear on a computer terminal if the information below were typed on the teletypewriter.

J.YOUNG,3,4,4
P.SMITH,2,2,3

7. The computer-based instruction unit from which this output came was most probably a _____ unit.

BESFIT

HOW MANY PAIRS OF VALUES DO YOU HAVE?
?5
AFTER EACH QUESTION MARK ENTER ONE PAIR OF VALUES.
?1,1
?2,2
?3,3
?4,4
?5,5

BEST LINE EQUATION IS Y = 1 X + 0

WOULD YOU LIKE TO ENTER NEW VALUES?
?NO

8. When someone calls a computer program from the computer, the program must be taken from_____ and loaded into_____.

9. The computer-based instruction unit from which this output came was most probably a_____unit.

IN THIS LESSON WE WILL LEARN ABOUT THE NOUN AS A PART OF SPEECH.
DEFINITION: NOUN-A NAME OF SOMETHING
EXAMPLE: THE DOG RAN AWAY.
DOG IS A NOUN BECAUSE IT IS A NAME
NOW YOU TRY ONE. WHAT IS THE NOUN IN THIS SENTENCE?
JANE CRIED QUIETLY.
?JANE
CORRECT, LETS TRY ANOTHER ONE, WHAT IS THE NOUN IN THIS SENTENCE?
HERE COMES THE CAT.
?HERE
WRONG. A NOUN IS NOT ALWAYS THE FIRST WORD IN A SENTENCE. REMEMBER, NOUNS ARE WORDS WHICH NAME SOMETHING. IN THIS SENTENCE THE WORD WHICH NAMES SOMETHING IS? CAT
CORRECT, LETS TRY ANOTHER ONE. WHAT IS THE NOUN IN THIS SENTENCE.

10. The computer-based instruction unit from which this output came was most probably a _____ unit.

```
WOULD YOU LIKE A PROGRAM DESCRIPTION?
YES

THIS PROGRAM WILL CALCULATE AN ASSET'S ANNUAL AND TOTAL
DEPRECIATION WHEN ASSET'S NAME, COST, YEARS USED, AND
DISPOSAL VALUE ARE SPECIFIED.

IN ADDITION, IT CAN PRINT OUT A TABLE SHOWING THE DEPRECIATION
EXPENSE, ACCUMULATED DEPRECIATION, AND THE BOOK VALUE FOR
EACH YEAR DURING THE USE OF THE ASSET.

WHEN ASKED 'DO YOU WANT A TABLE?' ENTER YES OR NO.

ASSET NAME?
?DESK

COST?
?2500

ESTIMATED LIFE (IN YEARS)?
?6

DISPOSAL VALUE?
?100

        TOTAL DEPRECIATION = 2400
        ANNUAL DEPRECIATION = 400
```

11. Time-sharing is when:

a. The computer executes two or more programs at the same time
b. Two or more persons use the same terminal for running programs
c. Two or more users share using a computer
d. Two or more terminals are connected to the computer simultaneously.

12. Look over the program listing below and answer the following questions.

```
 10 REM THIS IS A SAMPLE PROGRAM
 20 REM IN ORDER TO RUN THIS PROGRAM
 30 REM TYPE GET-SAMPLE AND RUN
 35 DIM A(20)
 40 INPUT A$,G1,G2,G3
 50 B=(G1+G2+G3)/3
 60 IF B>3.5 GO TO 90
 70 PRINT "STUDENT",A$,"GPA=",B
 80 GO TO 40
 90 PRINT "STUDENT",A$,"GPA=",B,"HONOR ROLL"
100 GO TO 40
110 END
```

What is the line number for the Processing Instruction?

_____

13. In the space below describe the purpose of this program

_____

_____

_____

_____

_____

_____

APPENDIX C: ATTITUDE QUESTIONAIRES

ID_____
(Last 4 digits of your Social Security No

Date_____

QUESTIONNAIRE SA

Directions

This questionnaire is designed to determine some prevalent attitudes about the use of computers in instruction. All responses will be anonymous. Each item is followed by a seven step scale from one extreme to the other. Please indicate your response to the item by placing an X at one of the spaces on the scale that corresponds most closely to your feeling.

1. For purposes of teaching the computer is _____.

   Highly useful /___/___/___/___/___/___/___/ Useless

2. I know _____ways of using the computer in the classroom.

   Many /___/___/___/___/___/___/___/ Hardly any

3. I feel _____about using the computer as an instructional tool in the classroom.

   Very confident /___/___/___/___/___/___/___/ Quite unsure

4. I am _____to use the computer in my teaching.

   Eager /___/___/___/___/___/___/___/ Unwilling

5. How would you characterize your competence in making use of a computer as an instructional tool?

   Considerable /___/___/___/___/___/___/___/ Negligable

6. I know of _____ways that I can use the computer in my teaching.

   Numerous /___/___/___/___/___/___/___/ Few

7. I plan to use the computer _____in my work.

   Often /___/___/___/___/___/___/___/ Seldom

8. How would you describe your ability to choose useful and appropriate computer applications for your class?

   Very good /___/___/___/___/___/___/___/ Very poor

9. The materials that were the subject of this workshop were _____ to me as a teacher.

Highly relevant /___/___/___/___/___/___/___/ Completely irrelevant

10. The inform tion that these materials presented will be generally _____ in my job.

Very useful /___/___/___/___/___/___/___/ Useless

11. I learned _____ from this workshop.

A great deal/___/___/___/___/___/___/___/Very little

12. There was _____ time allowed for learning the information presented in this workshop.

Too much/___/___/___/___/___/___/___/ Too little

13. The materials used in this worshop were _____ examples of educational materials.

Excellent/___/___/___/___/___/___/___/ Poor

14. The information and skills that I learned in this workshop will be _____ to me in the classroom.

Very valuable/___/___/___/___/___/___/___/ Worthless

15. There are _____ that I can immediately use what I have learned in this workshop.

Many ways/___/___/___/___/___/___/___/No ways

16. These materials will be a _____ future reference.

Valuable/___/___/___/___/___/___/___/ Worthless

17. I would be _____ to recommend this workshop to my fellow teachers.

Very eager/___/___/___/___/___/___/___/Extremely reluctant

18. The overall difficulty level of this workshop was _____.

Very difficult/___/___/___/___/___/___/___/ Very easy

19. My overall satisfaction with the workshop and materials can be characterized as_____.

Very great/ / / / / / / / Very little

20. Check the box which corresponds to your level of experience with the computer.

- ☐ no experience
- ☐ some experience (have used computers before)
- ☐ moderate experience (have written simple programs)
- ☐ experienced (know a programming language and are capable of writing classroom applications)

21. Circle the grade (s) of your primary teaching responsibility(ies):

K 1 2 3 4 5 6 7 8 9 10 11 12 12+

22. What is/are your subject matter specialty(ies):

a._____

b._____

c._____

d._____

23. What is your level of education

- ☐ B.A., B.S.
- ☐ B.A.+, B.S.+
- ☐ M.A., M.S.
- ☐ M.A.+, M.S.+
- ☐ Ph.D.

24. How many years of teaching experience do you have?_____

ID_____
(Last 4 digits of your Social Security No.

Date_____

QUESTIONNAIRE SB

Directions

This questionnaire is designed to determine some prevalent attitudes about the use of computers in instruction. All responses will be anonymous. Each item is followed by a seven step scale from one extreme to the other. Please indicate your response to the item by placing an X at one of the spaces on the scale that corresponds most closely to your feeling.

1. For purposes of teaching the computer is _____.

   Highly useful /___/___/___/___/___/___/___/ Useless

2. I know _____ways of using the computer in the classroom.

   Many /___/___/___/___/___/___/___/ Hardly any

3. I feel _____about using the computer as an instructional tool in the classroom.

   Very confident /___/___/___/___/___/___/___/ Quite unsure

4. I am _____to use the computer in my teaching.

   Eager /___/___/___/___/___/___/___/ Unwilling

5. How would you characterize your competence in making use of a computer as an instructional tool?

   Considerable /___/___/___/___/___/___/___/ Negligable

6. I know of _____ways that I can use the computer in my teaching.

   Numerous /___/___/___/___/___/___/___/ Few

7. I plan to use the computer _____in my work.

   Often /___/___/___/___/___/___/___/ Seldom

8. How would you describe your ability to choose useful and appropriate computer applications for your class?

   Very good /___/___/___/___/___/___/___/ Very poor

9. The materials that were the subject of this workshop were _____ to me as a teacher.

Highly relevant /___/___/___/___/___/___/___/ Completely irrelevant

10. The information that these materials presented will be generally _____ in my job.

Very useful /___/___/___/___/___/___/___/ Useless

11. I learned _____ from this workshop.

A great deal/___/___/___/___/___/___/___/Very little

12. There was _____ time allowed for learning the information presented in this workshop.

Too much/___/___/___/___/___/___/___/ Too little

13. The materials used in this worshop were _____ examples of educational materials.

Excellent/___/___/___/___/___/___/___/ Poor

14. The information and skills that I learned in this workshop will be _____ to me in the classroom.

Very valuable/___/___/___/___/___/___/___/ Worthless

15. There are _____ that I can immediately use what I have learned in this workshop.

Many ways/___/___/___/___/___/___/___/No ways

16. These materials will be a _____ future reference.

Valuable/___/___/___/___/___/___/___/ Worthless

17. I would be _____ to recommend this workshop to my fellow teachers.

Very eager/___/___/___/___/___/___/___/ Extremely reluctant

18. The overall difficulty level of this workshop was _____.

Very difficult/___/___/___/___/___/___/___/ Very easy

19. My overall satisfaction with the workshop and materials can be characterized as_____.

Very great/ / / / / / / / Very little

20. Check the box which corresponds to your level of experience with the computer.

- ☐ no experience
- ☐ some experience (have used computers before)
- ☐ moderate experience (have written simple programs)
- ☐ experienced (know a programming language and are capable of writing classroom applications)

21. Circle the grade (s) of your primary teaching responsibility(ies):

K 1 2 3 4 5 6 7 8 9 10 11 12 12+

22. What is/are your subject matter specialty(ies):

a._____

b._____

c._____

d._____

23. What is your level of education

- ☐ B.A., B.S.
- ☐ B.A.+, B.S.+
- ☐ M.A., M.S.
- ☐ M.A.+, M.S.+
- ☐ Ph.D.

24. How many years of teaching experience do you have?_____

APPENDIX D: BACKGROUND DATA ON WORKSHOP PARTICIPANTS

ID _____
(Last 4 digits of your Social Security No.)

Date (Table 1)

GROUP 1 N = 15

QUESTIONNAIRE SA

Directions

This questionnaire is designed to determine some prevalent attitudes about the use of computers in instruction. All responses will be anonymous. Each item is followed by a seven step scale from one extreme to the other. Please indicate your response to the item by placing an X at one of the spaces on the scale that corresponds most closely to your feeling.

X	S	
2.6	1.16	1. For purposes of teaching the computer is _____.
1 No Response		Highly useful / 4 / 1 / 6 / 3 / / / / Useless
4.1	1.71	2. I know _____ ways of using the computer in the classroom.
		Many / 2 / 1 / 1 / 4 / 5 / 1 / 1 / Hardly any
4.4	1.59	3. I feel _____ about using the computer as an instructional tool in the classroom.
		Very confident / 1 / / 3 / 4 / 4 / 1 / 2 / Quite unsure
1.6	.74	4. I am _____ to use the computer in my teaching.
		Eager / 8 / 5 / 2 / / / / / Unwilling
4.2	1.61	5. How would you characterize your competence in making use of a computer as an instructional tool?
		Considerable / / 3 / 2 / 3 / 5 / / 2 / Negligable
4.5	1.64	6. I know of _____ ways that I can use the computer in my teaching.
		Numerous / 1 / 1 / 2 / 2 / 5 / 3 / 1 / Few
3.1	1.33	7. I plan to use the computer _____ in my work.
		Often / 2 / 3 / 5 / 2 / 3 / / / Seldom
4.1	1.71	8. How would you describe your ability to choose useful and appropriate computer applications for your class?
		Very good / 1 / 2 / 3 / 2 / 4 / 2 / 1 / Very poor

ID _____
(Last 4 digits of your Social Security No.)

Date (Table 3)

Group 1 N = 11

QUESTIONNAIRE SB

Directions

This questionnaire is designed to determine some prevalent attitudes about the use of computers in instruction. All responses will be anonymous. Each item is followed by a seven step scale from one extreme to the other. Please indicate your response to the item by placing an X at one of the spaces on the scale that corresponds most closely to your feeling.

X	S	
2.2	.98	1. For purposes of teaching the computer is _____.
		Highly useful / 3 / 4 / 3 / 1 / / / / Useless
2.5	93	2. I know _____ ways of using the computer in the classroom.
		Many / 1 / 5 / 3 / 2 / / / / Hardly any
2.8	1.17	3. I feel _____ about using the computer as an instructional tool in the classroom.
		Very confident / / 5 / 5 / / / 1 / / Quite unsure
1.5	.52	4. I am _____ to use the computer in my teaching.
		Eager / 5 / 6 / / / / / / Unwilling
2.5	.93	5. How would you characterize your competence in making use of a computer as an instructional tool?
		Considerable / / 6 / 2 / 2 / 1 / / / Negligable
2.7	1.01	6. I know of _____ ways that I can use the computer in my teaching.
		Numerous / / 6 / 3 / 1 / 1 / / / Few
2.5	1.13	7. I plan to use the computer _____ in my work.
		Often / 2 / 3 / 5 / / 1 / / / Seldom
2.6	.67	8. How would you describe your ability to choose useful and appropriate computer applications for your class?
		Very good / / 5 / 5 / 1 / / / / Very poor

	S	Group 1 N = 11
.9	.70	9. The materials that were the subject of this workshop were _____ to me as a teacher. Highly relevant / 3 / 6 / 2 / / / / / Completely irrelevant
.9	.83	10. The information that these materials presented will be generally _____ in my job. Very useful / 3 / 7 / / 1 / / / / Useless
.5	.69	11. I learned _____ from this workshop. A great deal/ 6 / 4 / 1 / / / / /Very little
.4	.67	12. There was _____ time allowed for learning the information presented in this workshop. Too much/ / / / 8 / 2 / 1 / / Too little
.0	.45	13. The materials used in this worshop were _____ examples of educational materials. Excellent/ 1 / 9 / 1 / / / / / Poor
.9	.70	14. The information and skills that I learned in this workshop will be _____ to me in the classroom. Very valuable/ 3 / 6 / 2 / / / / / Worthless
.0	1.48	15. There are _____ that I can immediately use what I have learned in this workshop. Many ways/ 5 / 4 / 1 / / / 1 / /No ways
.5	.69	16. These materials will be a _____ future reference. Valuable/ 6 / 4 / 1 / / / / / Worthless
.6	.67	17. I would be _____ to recommend this workshop to my fellow teachers. Very eager/ 5 / 5 / 1 / / / / /Extremely reluctant
.4	1.21	18. The overall difficulty level of this workshop was _____. Very difficult/ / / 2 / 6 / 1 / 1 / 1 / Very easy
.9	.54	19. My overall satisfaction with the workshop and materials can be characterized as _____. Very great/ 2 / 8 / 1 / / / / / Very little

Group 1 N = 11

20. Check the box which corresponds to your level of experience with the computer.

- [2] no experience
- [2] some experience (have used computers before)
- [2] moderate experience (have written simple programs)
- [5] experienced (know a programming language and are capable of writing classroom applications)

21. Circle the grade (s) of your primary teaching responsibility(ies):

							1	1	7	7	7	6	
K	1	2	3	4	5	6	7	8	9	10	11	12	12+

22. What is/are your subject matter specialty(ies):

a. Math (7)

b. Science/Math (2)

c. Business (1)

d. Library (1)

23. What is your level of education

- [1] B.A., B.S.
- [2] B.A.+, B.S.+
- [1] M.A., M.S.
- [7] M.A.+, M.S.+
- [ ] Ph.D.

24. How many years of teaching experience do you have? X = 15.5 Range: 7-24

(Last 4 digits of your Social Security No.)

Date (Table 2)

GROUP 2 N = 12

QUESTIONNAIRE SA

Directions

This questionnaire is designed to determine some prevalent attitudes about the use of computers in instruction. All responses will be anonymous. Each item is followed by a seven step scale from one extreme to the other. Please indicate your response to the item by placing an X at one of the spaces on the scale that corresponds most closely to your feeling.

X	S	
1.8	.87	1. For purposes of teaching the computer is _____. Highly useful / 6 / 3 / 3 / / / / / Useless
2.8	1.3	2. I know _____ ways of using the computer in the classroom. Many / 2 / 3 / 3 / 3 / 1 / / / Hardly any
2.6	1.00	3. I feel _____ about using the computer as an instructional tool in the classroom. Very confident / 2 / 3 / 5 / 2 / / / / Quite unsure
1.4	.90	4. I am _____ to use the computer in my teaching. Eager / 9 / 2 / / 1 / / / / Unwilling
2.8	.97	5. How would you characterize your competence in making use of a computer as an instructional tool? Considerable / 1 / 4 / 4 / 3 / / / / Negligable
2.9	1.68	6. I know of _____ ways that I can use the computer in my teaching. Numerous / 2 / 4 / 3 / 1 / / 2 / / Few
1.4	.67	7. I plan to use the computer _____ in my work. Often / 8 / 3 / 1 / / / / / Seldom
2.9	1.08	8. How would you describe your ability to choose useful and appropriate computer applications for your class? Very good / 1 / 3 / 5 / 2 / 1 / / / Very poor

88

ID _____
(Last 4 digits of your Social Security No.)

Date _____ (Table 4) _____

Group 2 N = 12

QUESTIONNAIRE SB

Directions

This questionnaire is designed to determine some prevalent attitudes about the use of computers in instruction. All responses will be anonymous. Each item is followed by a seven step scale from one extreme to the other. Please indicate your response to the item by placing an X at one of the spaces on the scale that corresponds most closely to your feeling.

X	S	
.3	.49	1. For purposes of teaching the computer is _____.
		Highly useful / 8 / 4 / / / / / / Useless
2.0	1.04	2. I know _____ ways of using the computer in the classroom.
		Many / 5 / 3 / 3 / 1 / / / / Hardly any
2.3	.89	3. I feel _____ about using the computer as an instructional tool in the classroom.
		Very confident / 2 / 5 / 4 / 1 / / / / Quite unsure
.7	.78	4. I am _____ to use the computer in my teaching.
		Eager / 6 / 4 / 2 / / / / / Unwilling
2.4	1.16	5. How would you characterize your competence in making use of a computer as an instructional tool?
		Considerable / 3 / 4 / 2 / 3 / / / / Negligable
2.1	1.38	6. I know of _____ ways that I can use the computer in my teaching.
		Numerous / 6 / 2 / 2 / 1 / 1 / / / Few
.8	1.48	7. I plan to use the computer _____ in my work.
		Often / 8 / 2 / 1 / / / 1 / / Seldom
2.5	.80	8. How would you describe your ability to choose useful and appropriate computer applications for your class?
		Very good / 1 / 5 / 5 / 1 / / / / Very poor

X	S	Group 2 N = 12
2.2	1.03	9. The materials that were the subject of this workshop were _____ to me as a teacher. Highly relevant / 4 / 3 / 4 / 1 / / / / Completely irrelevant
2.2	1.53	10. The information that these materials presented will be generally _____ in my job. Very useful / 5 / 4 / 1 / 1 / / 1 / / Useless
2.1	1.08	11. I learned _____ from this workshop. A great deal / 5 / 2 / 4 / 1 / / / / Very little
4.7	1.15	12. There was _____ time allowed for learning the information presented in this workshop. Too much / / / 1 / 6 / 2 / 2 / 1 / Too little
2.5	1.00	13. The materials used in this worshop were _____ examples of educational materials. Excellent / 1 / 6 / 4 / / 1 / / / Poor
2.0	1.21	14. The information and skills that I learned in this workshop will be _____ to me in the classroom. Very valuable / 6 / 2 / 2 / 2 / / / / Worthless
2.5	1.51	15. There are _____ that I can immediately use what I have learned in this workshop. Many ways / 4 / 3 / 2 / 1 / 2 / / / No ways
.8	1.34	16. These materials will be a _____ future reference. Valuable / 7 / 3 / / 1 / 1 / / / Worthless
2.3	1.50	17. I would be _____ to recommend this workshop to my fellow teachers. Very eager / 4 / 4 / 2 / 1 / / 1 / / Extremely reluctant
.7	1.30	18. The overall difficulty level of this workshop was _____. Very difficult / / 1 / / 5 / 3 / 2 / 1 / Very easy
.3	1.06	19. My overall satisfaction with the workshop and materials can be characterized as _____. Very great / 3 / 5 / 2 / 2 / / / / Very little

Group 2 N = 12

20. Check the box which corresponds to your level of experience with the computer.

- [ ] no experience
- [ ] some experience (have used computers before)
- [3] moderate experience (have written simple programs)
- [9] experienced (know a programming language and are capable of writing classroom applications)

21. Circle the grade (s) of your primary teaching responsibility(ies):

K 1 2 3 4 5 6 7 8 9 10 11 12 12+

1 1 4 6 6 9

22. What is/are your subject matter specialty(ies):

a. Math (2)

b. Language Arts (1)

c. Business (2)

d. Science (3)
Math/Science (4)

23. What is your level of education

- [5] B.A., B.S.
- [1] B.A.+, B.S.+
- [ ] M.A., M.S.
- [2] M.A.+, M.S.+
- [ ] Ph.D.

4 None of the above

24. How many years of teaching experience do you have?_____

None = 8

Score = 4 w/ x = 5 and range: 4-7